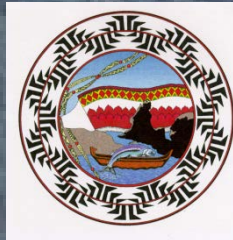


# Yurok Tribe and Climate Change: An Initial Prioritization Plan

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# Observed Impacts: Global





# Climate Change Impacts: National

## Impacts of Climate Change

Climate change is apparent now across our nation. Trends observed in recent decades include rising temperatures, increasing heavy downpours, rising sea level, longer growing seasons, reductions in snow and ice, and changes in the amounts and timing of river flows. These trends are projected to continue, with larger changes resulting from higher amounts of heat-trapping gas emissions, and smaller changes from lower amounts of these emissions. The observed changes in climate are already causing a wide range of impacts, and these impacts are expected to grow. Select examples follow.

### Sea Ice and Permafrost

Risks and costs in Alaska increase as thawing of permafrost damages roads, buildings, and forests, and declining sea ice increases coastal erosion and threatens the existence of some communities.

### Forests

Forest growth is generally projected to increase in much of the East, but decrease in much of the West as water becomes even scarcer. Major shifts in species are expected, such as maple-beech-birch forests being replaced by oak-hickory in the Northeast. Insect infestations and wildfires are projected to increase as warming progresses.

### Coldwater Fish

Salmon, trout, and other coldwater fish will face additional stresses as water temperatures rise and summer streamflows decline. Ecosystems and the tourism and recreation they support will be adversely affected.

### Coral Reefs

Rising water temperatures and ocean acidification threaten coral reefs and the rich ecosystems they support. These and other climate-related impacts on coastal and marine ecosystems will have major implications for tourism and fisheries.

### Heavy Downpours

More rain is already coming in very heavy events, and this trend is projected to increase across the nation. Such events are harmful to transportation infrastructure, agriculture, water quality, and human health.

### Agriculture

Increasing heat, pests, floods, weeds, and water stress will present increasing challenges for crop and livestock production.

### Water and Energy Interactions

As warming increases competition for water, the energy sector will be strongly affected because power plants require large amounts of water for cooling.

### Water Supply

Water supplies in the rapidly growing Southwest will become increasingly scarce, calling for difficult trade-offs among competing uses.

### Coastal Communities

Sea-level rise and storm surge will increase threats to homes and infrastructure including water, sewer, transportation, and communication systems. Many barrier islands and coastal marshes that protect the coastline and support healthy ecosystems will be lost.

### Heat Waves

Heat waves will become more frequent and intense, increasing threats to human health and quality of life, especially in cities.

### Energy Supply

Warming will decrease demand for heating energy in winter and increase demand for cooling energy in summer. The latter will result in significant increases in electricity use and higher peak demand in most regions.

## Responding to Climate Change

Responses to climate change fall into two major categories. "Mitigation" focuses on reducing emissions of heat-trapping gases or increasing their uptake to reduce the amount and speed of climate change. "Adaptation" refers to changes made to better respond to present or future climate conditions in order to reduce harm or take advantage of opportunities. Both are necessary elements of a comprehensive response strategy.



# Climate Change Impacts: Regional

Widespread climate-related impacts are occurring now and are expected to increase



# Climate Change Impacts: Yurok

Some Climate Change Impacts on Yurok Lands and Resources are already observable, other impacts are predicted to occur in the future.

- Sea Level Rise
- Changes in Temperature
- Changes in Precipitation
- Changes in Hydrology
- Changes in Aquatic Resources
- Changes in Terrestrial Resources





# Sea Level Rise & Yurok Territory

Global Warming is predicted to result in sea level rise, impacts coastal communities and areas around the globe.

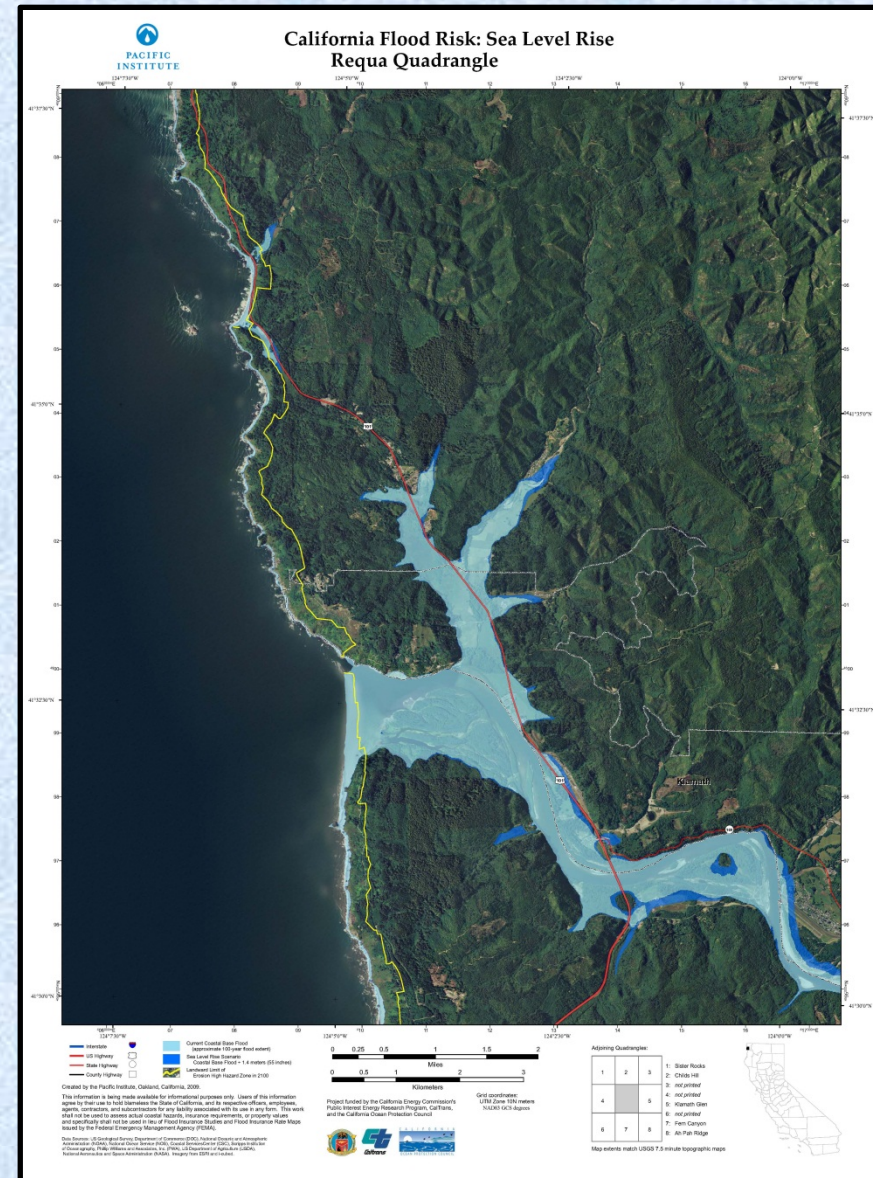
Sea level rise is a result of melting polar ice caps and glaciers, increasing the amount of water in the world's oceans.

The Pacific Institute developed maps for the purposes of illustrating sea level rise along the California Coast.

Current scientific observations indicate that sea level rise is happening faster than previously predicted.

Predicted impacts are coastal erosion (yellow line) and coastal inundation (the blue areas).

The Lower portions of the Yurok Reservation will experience the most impacts from sea level rise.





# Sea Level Rise & Yurok Territory

Predicted Sea Level rise along the coastal areas of Yurok Territory would impact coastal lagoons, communities and numerous Trust Resources around these ecosystems.

Coastal lagoons and resource areas will be inundated by the Pacific Ocean .

Numerous Cultural and Subsistence Resources and Use Areas will be impacted.

Plant and animal communities that inhabit these unique ecosystems may be lost, or forced to migrate to more suitable habitats.

Flooding and erosion of coastal areas threatens coastal communities, including places where many Yurok People live.





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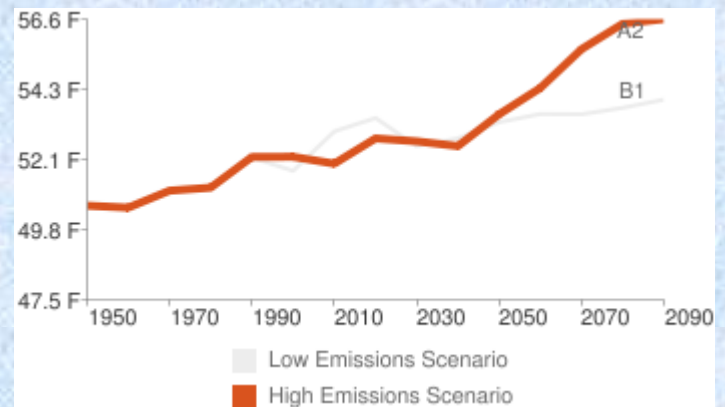


# Temperature Change & Yurok

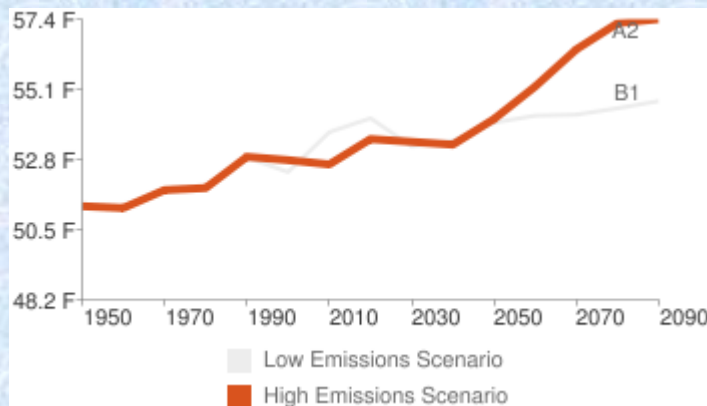
California has developed Climate Change Models to predict temperature changes over time. Source: <http://cal-adapt.org/>

Changes in temperature will impact water temperature, aquatic and terrestrial species and associated habitats.

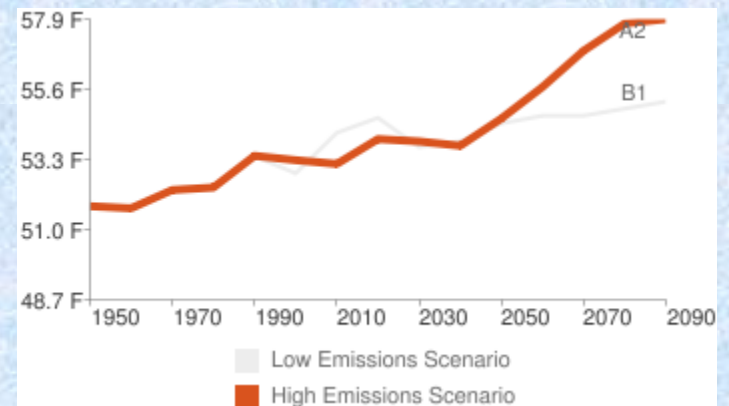
Klamath Area: Predicted Temperature Change



Freshwater Area: Predicted Temperature Change



Weitchpec Area: Predicted Temperature Change





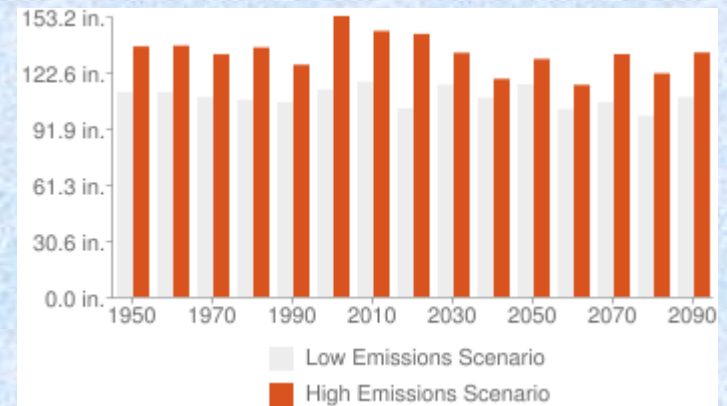
# Precipitation Changes & Yurok

California has developed Climate Change Models to predict potential impacts.  
Source: <http://cal-adapt.org/>

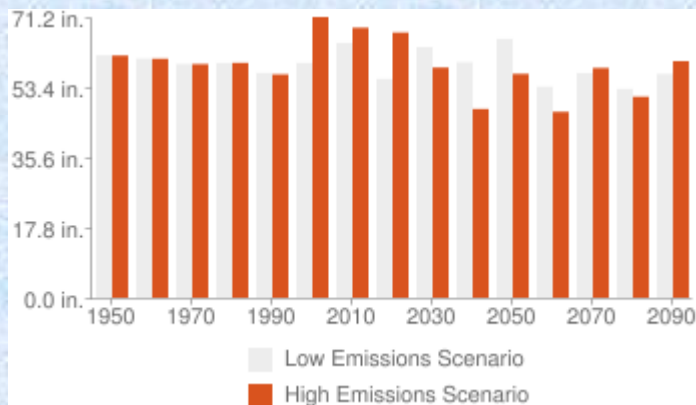
The graphs illustrate the predicted changes in precipitation throughout Yurok Territory.

Changes in precipitation may be in the amount of precipitation or the type (rain or snow).

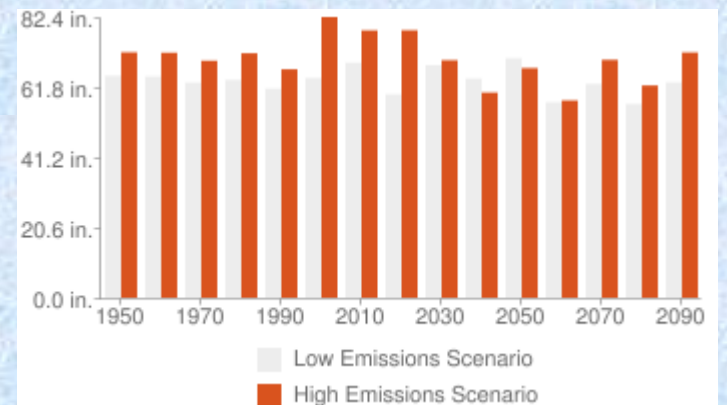
Klamath Area: Predicted Changes in Precipitation



Freshwater Area: Predicted Changes in Precipitation



Weitchpec Area: Predicted Changes in Precipitation

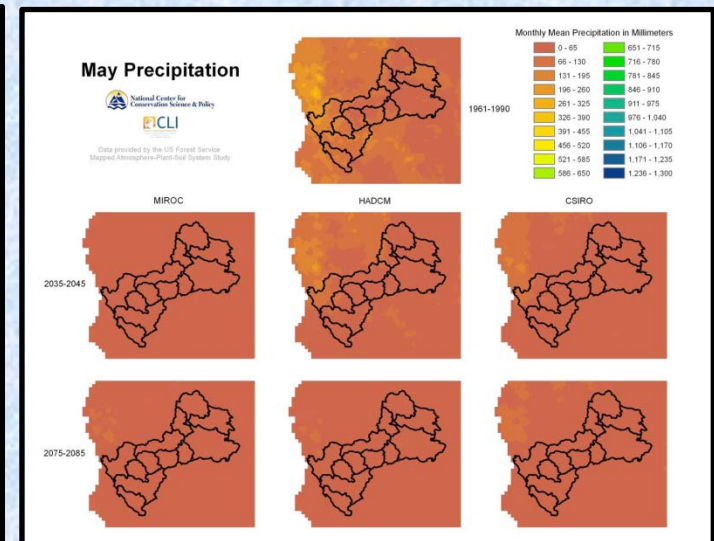
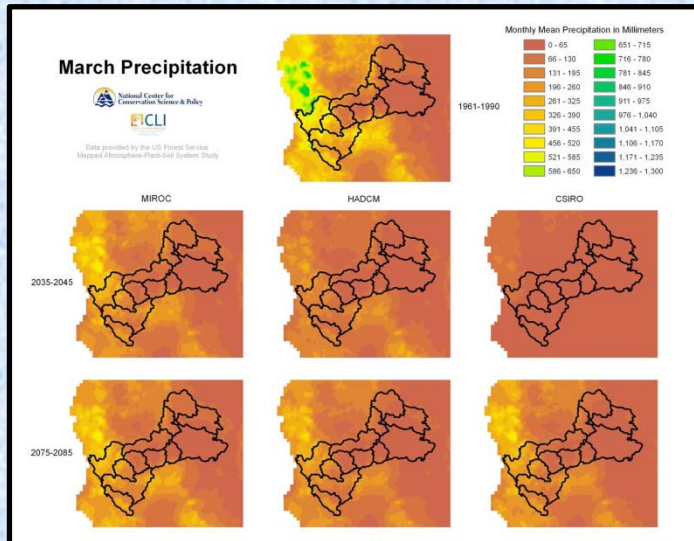
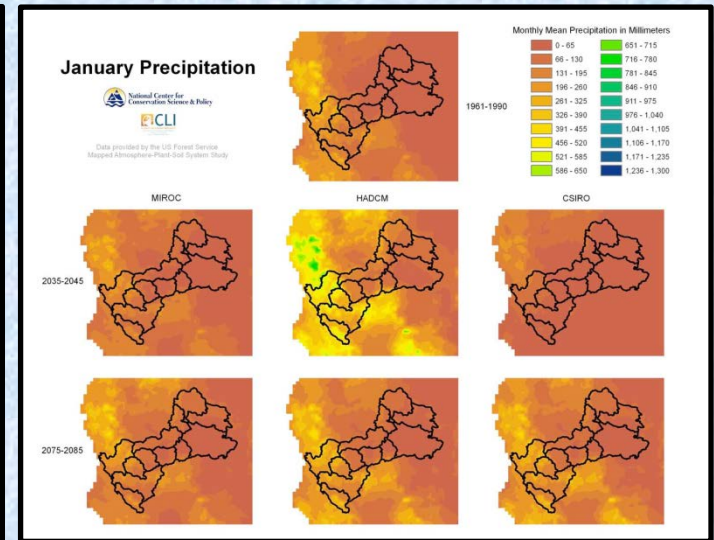
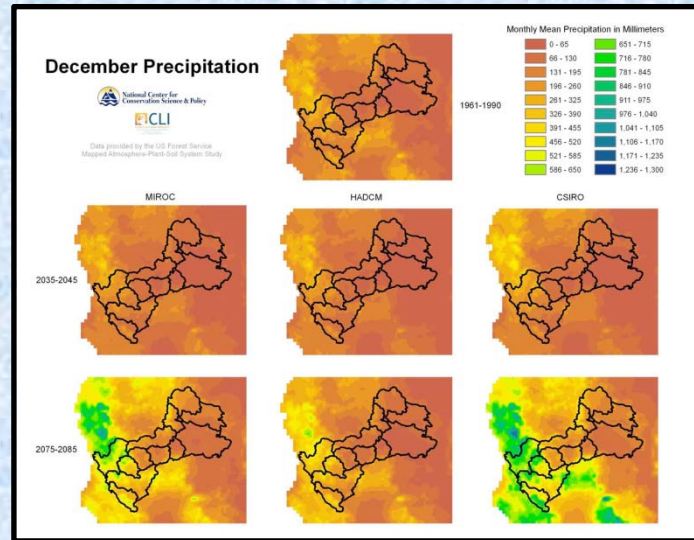




# Precipitation Changes & Yurok Klamath Basin

Three Climate Scenarios have been used to predict future changes in monthly precipitation in the Klamath Basin.

Changes in precipitation will impact snow pack and water availability, timing and intensity of rain events (ie: floods), stream flows and temperatures.



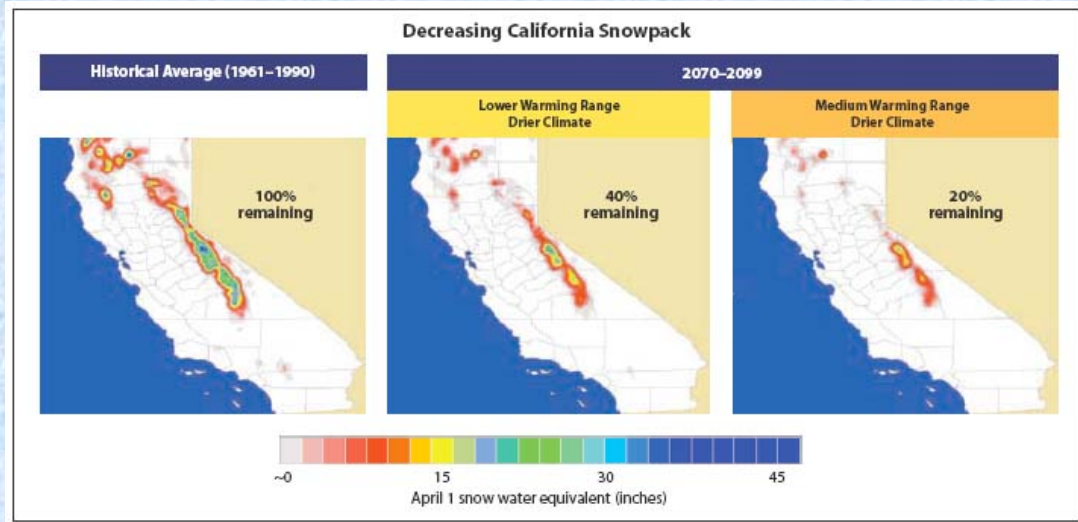


# Hydrological Changes & Yurok

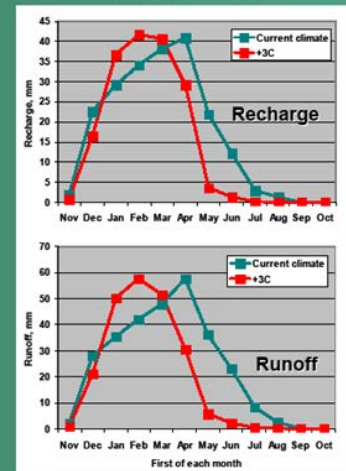
Predicted hydrological changes in the Klamath Basin may result from changes in the timing, type (snow versus rain) and intensity of precipitation throughout the entire basin.

These changes may result in more rain/less snow in winter months, higher winter flows and increased flooding, and lower flows and warmer water temperatures in summer months. Flood events, typically every 100 years, are predicted to occur more frequently.

Changes in hydrology may impact the timing and abundance of subsistence species such as salmon, pacific lamprey and sturgeon.

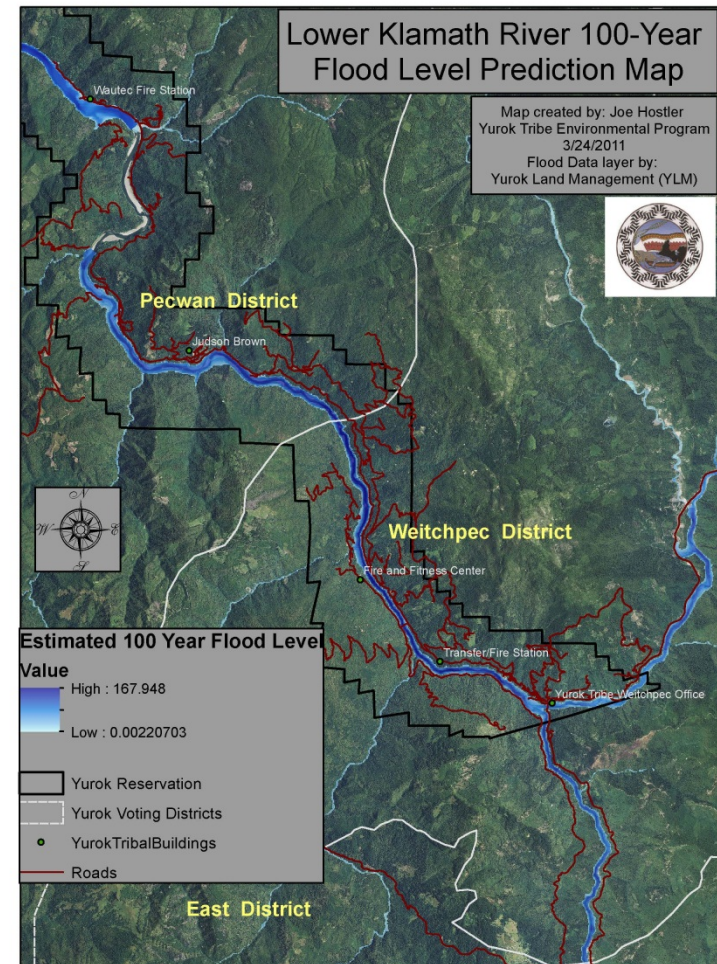


## Change in Water Availability: Klamath Basin





# Lower Klamath: 100 Year Flood Model





# Potential Climate Change Impacts and Aquatic Resources

- Water Sources
- Water Quality
- Water Temperature
- Wetlands
- Klamath River Estuary
- Fisheries Resources
- Coastal and Marine Resources
- Water Borne Diseases & Pathogens



# Potential Climate Change Impacts and Terrestrial Resources

- Species Loss
- Species Migration
- Invasive Species
- Increased Wildfire
- Drought
- Diseases
- Ecosystem Changes
- Habitat Loss



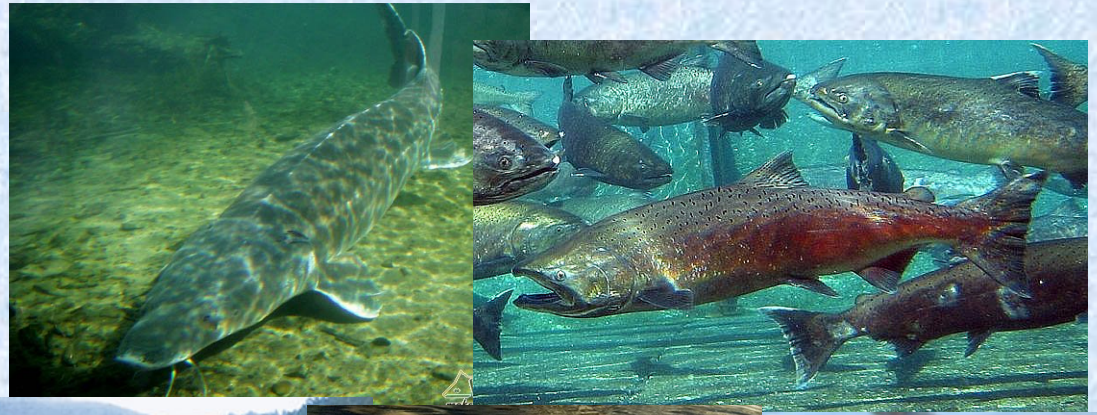


# Yurok Trust Resources & Climate Change

Some Yurok Trust resources may be at risk to the impacts of Climate Change.

Some species may change distribution, or timing and location of migration. Some may go extinct.

Ecologically sensitive species important to Yurok include: Salmon, Pacific lamprey (eel), Green Sturgeon, freshwater and ocean mussels, seaweed, Redwood, Tan Oak, Roosevelt Elk, and numerous other plants and animals used for subsistence, ceremonies, cultural practices (such as basketry) and traditional medicines.





# **Yurok Climate Change Priorities**

**Key findings from Community  
Scoping with Tribal Council,  
Tribal Membership, and  
Tribal Staff and Departments**



# Priority 1: Protecting and Preserving Yurok Lifeways, Culture and Traditions



# Priority 2: Protecting Yurok People and Yurok Communities

- Community Health
- Community Services
- Infrastructure and Development
- Transportation Systems
- Emergency Response
- Educational Services
- Cultural Resources and Use Areas
- Cultural Practices and Traditions



# Priority 3: Protecting and Preserving Yurok Traditional Ecological Knowledge

- Oral Traditions
- Yurok Stories
- Elder Wisdom
- Yurok Language
- Yurok Youth
- Cultural Restoration
- Education
- Traditional Resource Management



# Priority 4: Protecting Water Resources

- Klamath River Watershed
- Streams & Tributaries
- Wetlands
- Estuary
- Water Quality
- Cold Water Sources
- Pacific Ocean
- Coastal Waters





# Priority 5: Protecting Aquatic Species

- Salmon
- Sturgeon
- Pacific Lamprey
- Other Freshwater Species
- Marine and Coastal Species
- Fisheries Management & Restoration
- Habitat Protection and Restoration





# Priority 6: Protecting Terrestrial Species

- Redwood
- Tan Oak
- Basketry Plants
- Roosevelt Elk
- California Condor
- Traditional Medicines
- Traditional Foods





# Next Steps and Goals

- Secure Dedicated Climate Change Funding
- Continue Advocacy on Climate Change EJ Issues
- Increased engagement with agency and governmental Climate Change planning efforts
- Fill Data Gaps and Information Needs
- Conduct Comprehensive Vulnerability Assessment – underway for Water
- Identify and Protect Areas of Resiliency
- Develop Adaptation Plans
- Develop Mitigation Plans
- Implement Climate Change Plans
- Continued Community Outreach and Education



FISHING  
MOUTH KLAMATH RIVER  
REQUA, CALIF.

Who'klaw